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PROMOTING CALLER VOICE BROWSING IN A HOLD QUEUE

CROSS-REFERENCE TO RELATED APPLICATIONS

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The present application is related to the following co-pending applications:

(1) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010824US1);

(2) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010825US1);

(3) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010827US1);

(4) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010830US1); and

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(5) U.S. Patent Application No. ___/_____ (Attorney Docket No. AUS920010946US1).

BACKGROUND OF THE INVENTION

1.   Technical Field:

The present invention relates in general to
telecommunications and, in particular, to call hold centers.
Still more particularly, the present invention relates to
promoting caller voice browsing while a caller is waiting in a
hold queue.

2.   Description of the Related Art:

Many companies provide telephone-based access to help staff,
sales personnel, representatives, and automated menus via a call
center. Where high telephone call traffic is typical in
telephone access to a company's representatives, a PBX system
receives the call and distributes the call to an automatic call
distributor (ACD), thus incorporating a hold function in the call
center. ACDs are often employed to provide an even and
systematic distribution of incoming calls to multiple
representatives. In particular, ACDs typically provide incoming
calls with a direct connection to an available representative
until all representatives are busy. Then, calling parties are
placed in a call queue, and selectively connected to a
representative once a representative comes available.

Call queues may cause frustration and ill will of consumers
towards a company, particularly where excessively long waits,

full queues and accidental disconnects are encountered. One way
to alleviate some of the frustration associated with call queues
is by allowing the caller to select from a menu of multiple
services while waiting. Such services may include music, news,
weather, release of a the line to call a third-party, transfer of
the call to a chat room of other callers on hold, competitions,
and other activities in which callers may participate while on
hold. While participating in the services, the caller may
receive periodic updates as to a position in the queue and an
estimated wait time remaining.

In order to provide the caller with a menu of services,
interactive voice response units (IVRU) are often utilized. For
example, a caller placed in a queue of a call center may be
enabled to access multiple entertainment options while on hold.
An IVRU provides the caller with a menu of available
entertainment options accessible while on hold. While IVRU
systems provide a method for prompting a caller to select from a
menu and then automating a transcript of information selected by
the caller, IVRU systems are costly and are limited only to
output of transcripted information. For example, a news
transcript is output as a news service. However, the news
transcript may not cover a particular news item of interest to
the caller.

In view of the foregoing, it would be advantageous to
provide a method, system, and program for allowing a caller to
browse web pages while on hold in a call queue. In addition, it
would be advantageous to provide a method, system, and program

for allowing a caller to browse a selection of web pages that are specified for the caller according to a caller profile while the caller is on hold in a call queue. Further, it would be advantageous to promote browsing within the selection of web
5   pages by providing incentives.

SUMMARY OF THE INVENTION

In view of the foregoing, it is therefore an object of the present invention to provide an improved telecommunications system.

It is another object of the present invention to provide a method, system and program for improved call hold queues.

It is yet another object of the present invention to provide a method, system and program for promoting caller voice browsing while a caller is on hold in a call queue.

According to one aspect of the present invention, at least one web page is selected for voice browsing by a particular caller waiting in a hold queue. Then, the particular caller is offered an incentive to voice browse the at least one web page, such that an on hold system housing the hold queue may promote voice browsing of specific web pages.

According to another aspect of the present invention, a call from a caller is received with an authenticated identity at a hold queue. A caller profile stored in association with the authenticated identity is accessed via a network. A voice XML script is specified according to the caller profile, such that voice browsing while waiting in the hold queue is specified for the caller.

All objects, features, and advantages of the present
invention will become apparent in the following detailed written
description.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention
are set forth in the appended claims. The invention itself
however, as well as a preferred mode of use, further objects and
advantages thereof, will best be understood by reference to the
following detailed description of an illustrative embodiment when
read in conjunction with the accompanying drawings, wherein:

Figure 1 illustrates of a telecommunications network in
which the present invention may be implemented;

Figure 2 depicts a block diagram of a network call or
contact center system in which the present invention may be
implemented;

Figure 3 illustrates a block diagram of a voice browsing
system in accordance with the method, system, and program of the
present invention;

Figure 4 depicts a block diagram of an on hold system in
accordance with the method, system, and program of the present
invention;

Figure 5 illustrates an illustrative embodiment of a caller
profile in accordance with the method, system, and program of the
present invention;

Figure 6 depicts an illustrative embodiment of a call hold

queue web page directory database in accordance with the method, system, and program of the present invention;

Figure 7 illustrates an illustrative embodiment of scripts that may be utilized to direct caller browsing according to a queue subject in accordance with the method, system, and program of the present invention;

Figure 8 depicts a high level logic flowchart of a process and program for controlling a switching network in accordance with the method, system, and program of the present invention;

Figure 9 illustrates a high level logic flowchart of a process and program for controlling a PBX system within a call center in accordance with the method, system, and program of the present invention; and

Figure 10 depicts a high level logic flowchart of a process and program for controlling an on hold system in accordance with the method, system, and program of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A method, system, and program for promoting caller voice browsing while a caller is waiting in a hold queue are provided.

5   Advantageously, voice browsing allows a caller to browse web pages written in a voice extensible markup language (XML) language. In addition, voice browsing preferably provides for browsing web pages in other formats including, but not limited to, HTML, XML, Java and other scripting languages through

10   transcoding the pages into voice XML or an alternate audio format.

In the present invention, a caller may voice browse the expanse of the web or may select from a specified range of web pages. An on hold system in which a caller is waiting may

15   specify the range of web pages according to multiple criteria. In addition, in order to promote selection of the specified range of web pages, an incentive may be offered to a caller that is given to the caller in exchange for the caller browsing the

20   selection.

The range of web pages may be specified according to a caller profile. A caller profile may include information about a caller including, but not limited to, personal information,

25   purchase history, interests, on hold history, and incentives received. Preferably, the identity of a caller is first authenticated, such that the authenticated caller identity may be utilized to access the caller profile from a local or remote server system.

The range of web pages may also be specified according a
subject of a call indicated by a caller. Preferably, a caller
selects from a menu of call subjects. Then, web pages that are
5   related to the subject may be specified for selection by the
caller. By browsing pages related to the subject, a caller may
find an answer to the question prompting the current call and
hang up before requiring the attention of a representative.

10   In addition, an on hold system may also specify a selection
of web pages in order to promote a product or service or allow
another company to promote a product or service. These
Aadvertising@ type of pages may further be specified according to
the caller profile and subject of the call. For example, one set
15   of browsable pages for a particular product may be targeted
towards a younger set of people and another set of browsable
pages for a particular product targeted towards an older set of
people. The set of browsable pages that is selected for a
particular caller is preferably selected according to an age
20   indicated in the caller's profile.

Incentives offered to promote browsing of a specified
selection of web pages may include, but are not limited to, hold
queue position adjustments, membership points, cash values,
25   electronic coupons, and other values that may be redeemed while
the caller is on hold or may be stored with a caller profile for
future redemption.

For purposes of the present invention, telephony devices are

termed origin devices when utilized for origination of a call to
an intermediary device and are termed destination devices when
utilized for receipt of a call from an intermediary device.
Subscribers to a call are termed callers when originating a call
5   and are termed callees when receiving a call. Callers and
callees may or may not be line subscribers to the particular
telephony device utilized.

In the following description, for the purposes of
10   explanation, numerous specific details are set forth to provide a
thorough understanding of the present invention. It will be
apparent, however, to one skilled in the art that the present
invention may be practiced without these specific details. In
other instances, well-known structures and devices are shown in
15   block diagram form to avoid unnecessarily obscuring the present
invention.

The present invention may be executed in a variety of
systems, including a variety of computing systems and electronic
20   devices under a number of different operating systems. In one
embodiment of the present invention, the on hold call queue
system is a computer system that incorporates communication
features that provide telephony, messaging, and information
services to a plurality of callers. In general, the present
25   invention is preferably executed in a computer system that
performs computing tasks such as manipulating data in storage
that is accessible to the computer system.

With reference now to the figures, and, in particular, with

reference now to **Figure 1,** there is depicted a block diagram of a

network environment in which the present invention may be

implemented.   While the present invention is described with

reference to one type of network environment, it will be

5   understood by one with skill in the art that the present

invention may be implemented in alternate types of network

environments.

GENERAL NETWORK ENVIRONMENT

10   First, the network environment incorporates a Public

Switching Telephone Network (PSTN) **10.**   As is known in the art

the core of PSTN **10** may include multiple telephone networks, each

owned by one of multiple independent service providers.   Each

15   telephone line is carried by an independent service provider

within PSTN **10** and is typically assigned to at least one

subscriber.

Switching of a call within an independent service provider's

20   telephone network is considered trusted movement within a trusted

network because the call remains within the company's telephone

network infrastructure.   However, calls may be transferred from

one service provider's telephone network to another service

provider's telephone network in generally trusted movement.

25   Generally, service providers are in competition with one another

and therefore there is general trust in transferring a call, but

not trust in sharing of subscriber information from one service

provider to the next without security features.

Advantageously, each telephone network within PSTN **10** may

access a data network functioning as an extension to PSTN **10** via

an Intranet. Data networks may include, for example, subscriber

profiles, billing information, and preferences that are utilized

5   by a service provider to specialize services. Transfer of

information between a service provider's data network and

telephone network is trusted movement in sharing of information.

Further, each telephone network within PSTN **10** may access

10   server systems external to PSTN **10** in the Internet Protocol over

the Internet or an Intranet. Such external server systems may

include an enterprise server, an Internet service provider (ISP),

an access service provider (ASP), a personal computer, and other

computing systems that are accessible via a network. In the

15   present embodiment, transfer of information between PSTN **10** and

server systems accessible via network **20** is totally untrusted and

therefore may require authentication and additional security.

In the present invention, network **20** may comprise a private

20   network, Intranet, or a public Internet Protocol network.

Specifically, telco application server **22,** generic application

server **24,** pervasive application server **26,** and systems

management server **28** represent server systems external to PSTN **10**

that may be accessed by PSTN **10** over network **20.**

25

In particular, telco application server **22** preferably

includes multiple telco specific service applications for

providing services to calls transferred to a server external to

PSTN **10.** In particular, a call may be transferred from PSTN **10**

to telco application server **22** to receive at least one service
and then the call is transferred back to PSTN **10**. Such services
may also be provided to calls within PSTN **10**, however placing
such services at a third party such as telco application server

5 **22**, is advantageous because adding services and information to
PSTN **10** is time consuming and costly when compared with the time
and cost of adding the services through telco application server
22.

10 In accord with an advantage of the present invention, as
will be further described, the identity of both the caller and
the callee may be authenticated by one of telephony devices **8a-
8n**, PSTN **10**, or by telco application server **22**. By
authenticating the actual identity of the person making a phone

15 call and the person receiving the phone call, rather than the
identification of a device from which a call is made and
received, an enhanced specialization of services to subscribers
may be performed.

20 An authentication service within telco application server **22**
may include identification and verification of the identity of a
caller and/or callee of a particular call. Such a service may
require that subscribers provide voice samples when setting up a
subscription. The stored voice samples may then be compared

25 against voice samples received for a particular call in order to
authenticate the identity of a current caller or callee of the
particular call.

Generic application server **24** preferably accesses

independent server systems that provide services. For example, a
messaging server, a financial server, an Internal Revenue Service
(IRS) server, and database management system (DBMS) server may be
accessed in HTTP via network **20**. Each of these servers may
5   include a telco service application that requires authentication
of the subscriber before access is granted. For example, a
financial server may provide a telco service application that
allows an authenticated subscriber to access current financial
records and request stock quotes from the financial server.

10   Pervasive application server **26** manages services for
wirelessly networked devices. In particular, pervasive
application server **26** preferably handles distribution of wireless
packets of voice and data to wirelessly networked devices
15   utilizing a standard such as short messaging service (SMS)
messaging or other 3G standards.

Systems management server **28** manages subscriber
personalization via the web. In particular, systems management
20   server **28** includes browser technology that includes a
provisioning console **30** for establishing a subscriber profile and
a management console **32** for managing and updating the subscriber
profile. A subscriber preferably accesses the consoles of
systems management server **28** via the Internet utilizing a
25   computing system, such as computing systems **34a-34n**.

The subscriber profile may be accessed at systems management
server **28** by other external servers and PSTN **10** via network **20**.
In addition, a local copy of a subscriber profile updated in

systems management server **28** may be stored within a particular service provider's data network or telephone network. Each service provider may specify the types of preferences and other information included within a subscriber profile.

5

In particular, a subscriber may provide a voice imprint when establishing a subscriber profile through provisioning console **30**. Other types of authentication information may also be provided including, but not limited to, a password, an eye scan, a smart card ID, and other biometric methods. In addition, a subscriber may designate billing preferences, shopping preferences, buddy list preferences, and other preferences that enable specialized service to the subscriber when the subscriber's identity is authenticated from the voice imprint or other identification.

Advantageously, a management agent is built into each external server to monitor the services provided by each server according to the authenticated subscriber receiving the services. By monitoring service output according to subscriber, the subscriber may then be billed according to each use of a service.

PSTN **10** preferably includes both voice and data signaling networks that interface with network **20** via gateways. Each of the gateways acts as a switch between PSTN **10** and network **20** that may compress a signal, convert the signal into Internet Protocol (other protocol) packets, and route the packets through network **20** to the appropriate server.

In particular, the voice network interfaces with network **20** through media gateway **14** which supports multiple protocol gateways including, but not limited to, SIP. SIP is a signaling protocol for Internet conferencing, telephony, presence, events

5   notification and instant messaging.

In addition, in particular, the data signaling network interfaces with network **20** through signaling gateway **12** which supports multiple protocol gateways including, but not limited

10   to, parlay protocol gateways and SS7 protocol gateways. Internet servers, such as telco application server **22** may include protocol agents that are enabled to interact with multiple protocols encapsulated in Internet Protocol packets including, but not limited to, SS7 protocol, parlay protocol, and SIP.

15

PSTN IDENTITY AUTHENTICATION AND CALL CONTROL

Looking into PSTN **10,** a telephone network typically includes multiple switches, such as central office switches **11a-11n,** that

20   originate, terminate, or tandem calls. Central office switches **11a-11n** utilize voice trunks for transferring voice communications and signaling links for transferring signals between signaling points.

25   Between signaling points, one central office switch sends signaling messages to other central office switches via signaling links to setup, manage, and release voice circuits required to complete a call. In addition, between signaling points, central office switches **11a-11n** query service control points (SCPs) **15** to

determine how to route a call. SCPs **15** send a response to the
originating central office switch containing the routing
number(s) associated with the dialed number.

5   SCPs **15** may be general purpose computers storing databases
of call processing information. While in the present embodiment
SCPs **15** are depicted locally within PSTN **10,** in alternate
embodiments SCPs **15** may be part of an extended network accessible
to PSTN **10** via a network.

10   One of the functions performed by SCPs **15** is processing
calls to and from various subscribers. For example, an SCP may
store a record of the services purchased by a subscriber, such as
a privacy service. When a call is made to the subscriber, the
15   SCP initiates an announcement to a caller to identify themself to
the subscriber with the privacy service who is being called.
According to an advantage of the invention, authentication of the
subscriber receiving the call may be required before the privacy
service is initiated for that subscriber.

20
           In particular, network traffic between signaling points may
be routed via a packet switch called an service transfer point
(STP) **13.** STP **13** routes each incoming message to an outgoing
signaling link based on routing information. Further, in
25   particular, the signaling network may utilize an SS7 network
implementing SS7 protocol.

           Central office switches **11a-11n** may also send voice and
signaling messages to intelligent peripherals (IP) **17** via voice

trunks and signaling channels. IP **17** provides enhanced
announcements, enhanced digit collection, and enhanced speech
recognition capabilities.

5   According to an advantage of the present invention, the
identity of a caller is authenticated according to voice
authentication. Voice authentication is preferably performed by
first identifying a subscriber by matching the name or other
identifier spoken with a subscriber name or identifier. Next,
10   voice authentication requires verifying that the voice audio
signal matches that of the identified subscriber. However, in
alternate embodiments, the identity of a subscriber may be
authenticated according to passwords, eye scans, encryption, and
other biometric methods.

15   In particular, to perform subscriber authentication of audio
signals received from callers, IP **17** may include storage for
subscriber specific templates or voice feature information, for
use in authenticating subscribers based on speech. If a
20   subscriber specific template is not stored on a local IP **17**, then
a remote IP containing the subscriber specific template may be
accessed via a network. In addition, local IP **17** may access
systems management server **28** or another repository for voice
imprints to access the subscriber specific template.
25
        Where IP **17** authenticates the identity of a caller (e.g. the
subscriber placing a call), a voice identifier (VID) representing
the authenticated caller identity is transferred as a signal for
identifying the caller. In addition, where IP **17** authenticates

the identity of a callee (e.g. the subscriber receiving a call),
a reverse VID (RVID) including the callee identity is transferred
as a signal for identifying the callee.

5   Advantageously, VIDs indicate through text, voice, or video
the identity of a caller. For example, a caller's name may be
transferred as the identity of a caller. Alternatively, a video
clip stored with the subscriber template may be transferred as
the identity of a caller. Additionally, VIDs may indicate the
10   identity of the device utilized by a caller to provide context
for a call. Further, VIDs may indicate which system or systems
have authenticated the caller identity.

        After a VID and/or RVID are determined by IP **17**, IP **17** and
15   SCP **15** may communicate to designate which services are available
according to VID and RVID. Advantageously, by designating
services according to a VID and/or RVID, subscribers are provided
with services and billed for those services independent of the
devices utilized by subscribers. In particular, a 1129 protocol
20   or other protocol may be utilized to enable signal communications
between IP **17** and SCPs **15**. In addition, as previously described,
caller authentication to determine VIDs and RVIDs may be
performed by a third party, such as telco application server **22**.

25   An origin telephony device or destination telephony device
may also determine a VID and/or RVID for the caller and/or callee
of a call. In particular, telephony devices **8a-8n** and call
centers **16a-16n** may function as origin and designation telephony
devices. Each of the telephony devices may include a database of

voice templates that may be matched to authenticate the identity
of a caller or callee. In addition, each of the telephony
devices may access a third party, such as telco application
server **22**, to authenticate the identity of the caller or callee.

5   In either case, the telephony device transmits a VID and/or RVID
with a call to PSTN **10.**

Telephony devices **8a-8n** may include, but are not limited to
wireline devices, wireless devices, pervasive device equipped

10   with telephony features, a network computer, a facsimile, a
modem, and other devices enabled for network communication.
Advantageously, as previously described, a voice authentication
functioning device may be included in each of telephony devices
8a-8n.

15

In addition, telephony devices **8a-8n** may each incorporate a
display that provides a visual output of a VID or RVID.
Alternatively, such a display may be provided in a separate
device connected to the line in parallel to telephones **8a-8n.**

20   According to one advantage of the present invention, the identity
of the actual caller or actual callee are output to a display in
association with a call. In addition, other context information
about the caller including, but not limited to, the device from
which the call originates or is answered, ratings for a caller or

25   callee, and other context information may be output to a display
in association with a call.

Telephony devices **8a-8n** are communicatively connected to
PSTN **10** via wireline, wireless, ISDN, and other communication

links. Preferably, connections to telephony devices **8a-8n**
provide digital transport for two-way voice grade type telephone
communications and a channel transporting signaling data messages
in both directions between telephony devices **8a-8n** and PSTN **10.**

5

    In addition to telephony devices **8a-8n,** advanced telephone
systems, such as call centers **16a-16n,** may be communicatively
connected to PSTN **10** via wireline, wireless, ISDN and other
communication links. Call centers **16a-16n** may include PBX
systems, hold queue systems, private network systems, and other
systems that are implemented to handle distribution of calls to
multiple representatives or agents.

    Returning to central office switches **11a-11n,** typically, one
central office switch exists for each exchange or area served by
the NXX digits of an NXX-XXXX (seven digit) telephone number or
the three digits following the area code digits (NPA) in a ten-
digit telephone number. The service provider owning a central
office switch also assigns a telephone number to each line
connected to each of central office switches **11a-11n.** The
assigned telephone number includes the area code (NPA) and
exchange code (NXX) for the serving central office and four
unique digits (XXXX).

25   Central office switches **11a-11n** utilize office equipment
(OE) numbers to identify specific equipment, such as physical
links or circuit connections. For example, a subscriber's line
might terminate on a pair of terminals on the main distribution
frame of one of central office switches **11a-11n.** The switch

identifies the terminals, and therefore a particular line, by an
OE number assigned to that terminal pair. For a variety of
reasons, a service provider may assign different telephone
numbers to the one line at the same or different times. For

5   example, a local carrier may change the telephone number because
a subscriber sells a house and a new subscriber moves in and
receives a new number. However, the OE number for the terminals
and thus the line itself remains the same.

10   On a normal call, a central office switch will detect an
off-hook condition on a line and provide a dial tone. The switch
identifies the line by the OE number. The central office switch
retrieves profile information corresponding to the OE number and
off-hook line. Then, the central office switch receives the

15   dialed digits from the off-hook line terminal and routes the
call. The central office switch may route the call over trunks
and possibly through one or more central office switches to the
central office switch that serves the called party's station or
line. The switch terminating a call to a destination will also

20   utilize profile information relating to the destination, for
example to forward the call if appropriate, to apply distinctive
ringing, etc.

In the present invention, when a central office switch
25   detects an off-hook condition on a line, the central office
switch will then determine if a VID signal is transferred from
the off-hook telephony device. If a VID is transferred, then a
query is made to SCP **15** according to the VID for any services
specified for the authenticated subscriber. Alternatively, a

query may be transferred via network **20** to an external server, such as system management server **28,** to determine the services specified for the caller. The central office switch will then receive the dialed digits from the off-hook line terminal and

5   route the call, providing services according to those preferred by the authenticated subscriber.

Alternatively, if a VID signal is not transferred from the off-hook telephony device, then the central office switch will

10 provide a dial tone and transfer the call to an IP that prompts the caller to provide a voice entry or other identification. Alternatively, the central office switch may transfer the call to telco application server **22** for use of the caller authentication service. In either case, the identity for the subscriber is

15 preferably authenticated, the call is transferred back to the central office switch, services are provided according to the VID authenticated for the subscriber, and the call is routed according to dialed digits from the off-hook line terminal.

20 In addition, an RVID may be provided in the present invention to authenticate the identity of a callee receiving the call. When a call is answered, the call is transferred back to an IP or telco application server **22** to authenticate the identity of the callee answering the call.

25

As another alternative to dialed digits from the off-hook line terminal, a caller may utilize a voice calling function of a telephony device for indicating how the call should be routed. For example, a caller may say the name of a preferred callee.

The device or IP **17** may determine a person within the caller's
calling list that matches the voiced name. The matching person's
digits are then utilized to route the call.

5   CALL CENTER ENVIRONMENT

      Referring now to **Figure 2,** there is an illustrative network
call center environment in which the present invention may be
implemented. It will be appreciated by one with skill in the art
10 that although a particular call center environment is described
below, the invention is not limited to use within the described
network environment, rather, the inventive queue position
advancement process may be implemented within any on-hold
information service regardless of the telephony environment.

15
      As illustrated, multiple incoming calls are received at a
call center **16a.** In particular, a connection **38** includes a voice
trunk and a signal link, such that both voice and VID signals may
be received at PXB **40** from PSTN **10.** Connection **38** is preferably
20 connected to PSTN **10** via a wireline, wireless, Internet Protocol
network, or other connection. PBX **40** distributes incoming calls
to multiple representative terminals **44a-44n** via connection **39,**
wherein connection **39** also includes a voice trunk and a signal
link. In particular, PBX systems, and in particular PBX systems
25 with automatic call distribution (ACD) ability, are well known in
the art as switching systems designed to received telephone calls
destined for call center **16a** and to queue those call when a call
handling agent is not available.

In the description which follows, it will be assumed that all representative terminals **44a-44n** are busy and therefore PBX **40** cannot respond to an incoming call by making a direct connection to one of representative terminals **44a-44n**. As a result, PBX **40** is forced to place the incoming call on hold. However, an advantage of the present invention is that when a call is transferred to one of representative terminals **44a-44n**, the VID for the call is also transferred, enabling a representative to receive an authenticated identity of a caller. Additional authentication may be required by PBX **40** where callers are accessing sensitive information from representatives.

After placing the incoming call on hold, the VID, time of call, and other information received by PBX **40** are forwarded to on hold system **42**. On hold system **42** preferably creates a record based on the call and positions the call within one of call queues **46a-46n**. In particular, the call queue selected for a call is specified by a caller indication of the subject matter of a call. In addition, a single call queue may be utilized to store all calls on hold.

While in the present embodiment PBX **40** forwards calls to a single on hold system, in alternate embodiments, PBX **40** may forward calls to multiple on hold systems and to multiple call centers. In addition, on hold system **42** and other on hold systems may be coupled to PBX **40** or may be remotely accessed by PBX **40**. Further, while in the present embodiment on hold system **42** is depicted as an independent system, on hold system **42** may

also be incorporated within PBX **40**.

While the call is on hold, an interactive voice response
unit (IVRU) **41**, coupled to PBX **40** and on hold system **42**, may

5   offer the caller a menu of available options for receiving call
hold queue information for on hold system **42**. In general, IVRU
41 is a voice information system which may be arranged to (i)
prompt a caller for specific information by asking questions
based on a set of modules in a transactions script, (ii) collect

10   that information by detecting and interpreting dual tone
multifrequency (DTMF) signals entered by the caller or by
recognized speech input by the caller, (iii) organize the
collected information in a specific format and (iv) forward the
collected information to be utilized within on hold system **42**.

15   For purposes of the present invention, prompts to the caller may
be in voice, text, video, and/or graphical formats depending on
the interface receiving the prompt. In addition, for purposes of
the present invention, a voice browser may be implemented to
interact with a caller according to voice XML scripted pages.

20
According to one advantage of the present invention, a
caller profile according to the VID may be accessed by on hold
system **42** from a caller profile server **50** and/or from a local
caller profile database accessible to on hold system **42**. On hold

25   system **42** may then utilize the caller profile to specify the menu
of available options and other services provided to the caller
while the caller is on hold.

Caller profile server **50** preferably includes profiles for
multiple callers stored according to VIDs that are accessible

across multiple call centers **16a-16n**. Caller profile server **50**
may be located within the extended network of PSTN **10** as a
database that is preferably shared across multiple service
providers accessible via an Intranet. Alternatively, as

5   depicted, caller profile server **50** may be located in the external
network of PSTN **10**, where the external network is available via
network **20**. As illustrated, on hold system **42** accesses caller
profile server **50** via network **20**.

10   As illustrated, on hold system **42** accesses caller profile
server **50** via network **20**. Advantageously, by storing caller
profiles in caller profile server **50** according to VID, only a
single identifier is needed to access a caller profile and only a
single location is provided for access to a caller profile.

15   Further, advantageously, a caller is only required to enter
preferences and other information in one place, for storage
according to VID, where the information is then accessible to
multiple diverse call centers and other systems. As an
additional advantage, different portions of a caller profile may

20   be stored in different server system locations, but each
referenced for a single caller according to that caller's VID.

Advantageously, in addition to recording on hold activity
according to VID in a caller profile, other network activity

25   performed by the caller may be recorded according to VID in a
caller profile. For example, an individual may be required to
provided a voice sample in order to determine a VID for logging
onto a network via a computer system. Web pages accessed by the
caller via the network connection are preferably logged according

to the VID in the caller's profile. Alternatively, for an individual to access a particular web site, the individual may be required to provide a voice sample that is authenticated to determine a VID for logging onto the particular web site. In

5   either case, the activity of an individual according to VID may be stored in a caller profile accessible to other network servers and to call centers.

        Monitoring a caller's use of a website is particular

10   advantageous such that the advertising that has been displayed, the links selected, and documents downloaded may be monitored according to VID. For example, where an individual accesses a web site for ACompany G@, an advertisement from a Aproduct A@ is displayed and the individual selects to view two pages from the

15   site. When the individual's VID is identified for a call five minutes later and the caller is placed on hold, it is advantageous to know what information the caller has already received from the web site, such that the caller is not redirected to the same information via a voice browser while on

20   hold. Further, it is advantageous for other vendors to know what web sites a caller has already visited, such that those vendors may offer the caller incentives to visit web sites with related, but competing, products and service.

25   In addition, by storing records of voice browsing and web browsing according to VID in a caller profile, a caller may access a page previously browsed via either interface. Further, call centers may specify voice browsing of news, music and other selections in view of other browsing via voice or web browser,

that a caller has already performed within a particular period of
time.

 5   According to one advantage of the present invention, a voice
browser **46** is also implemented within on hold system **42**. Voice
browser **46** is utilized for browsing the Internet and in
particular for browsing pages stored at a help server **52**.

10   Help server **52** preferably includes web scripts that may be
output to multiple devices including computer systems via a web
browser and telephony devices via a voice browser. In
particular, the scripts may include help information that is
searchable by a user through a web browser, but is also
searchable by a caller via a voice browser.

15

       For an IVRU to play the help information to a caller, the
information would need to be stored in a script that is readable
by the IVRU. In addition, redundant copies of the same
information would be stored in multiple places including the web
20   server and the IVRU. However, according to the present
invention, browsable scripts only need be stored in one location
to service callers and web surfers.

       With reference now to **Figure 3**, there is an illustrative
25   block diagram of a voice browsing system in accordance with the
method, system, and program of the present invention. For
purposes of the present invention, help server **52** is a web based
server communicatively connected to network **20.** As depicted,
help server **52** includes a controller **54** for controlling the

operations of help server **52**. In particular controller **54** may

include at least one processor, memory, data storage, system

software, and application software that function together to

perform the processes of controller **54**.

5

In addition, help server **52** includes multimedia database **56**

and audio/grammar database **60**. Multimedia database **56** may

include graphics, sound, video and other data that may be read by

a web browser **64** executing on computing system **34a**. Help server

10   **52** also includes audio/grammar database **60** for directing voice

browser **46** in converting voice XML into audio output.

Further, help server **52** includes scripts **58**. Scripts **58**

includes programmed web pages that may be output as HTML

documents **66** or voice XML documents **68**. HTML documents **66** are

15   preferably transmitted to a computing system for output via a

display interface controlled by web browser **64**. Voice XML

documents are preferably converted into audio output by voice

browser **46** and output via telephony device **8a**. Telephony device

20   **8a** may include a wireline phone, a wireless phone, a PDA with

telephony features, and other computing devices with telephony

features that provide audio input and output.

In the present invention, scripts **58** preferably include

25   information including, but not limited to, directions, frequently

asked questions, product and service specifications, product and

service advertising, and other information which may be visibly

and audibly output. Scripts **58** are preferably designed in a

hierarchy according to subject, such that a user or caller may

easily transition from one page to the next within a particular

subject. Further, scripts **58** allow for a user of computing

system **34a** or a caller from telephony device **8a** to receive the

same help information, presented at different interfaces.

5

In addition, in the present invention, voice browser **46**

includes audio output(computer-synthesized and/or recorded) and

audio input(voice and/or keypad tones). Importantly, voice

browser **46** connects the Internet with a phone network in order to

10 extend the power of the web to telephony devices while a call

placed via those telephony devices is waiting on hold.

In general, XML is advantageous because a web page

programmed in XML may be individually specified for each caller.

15 In the present example, voice browser **46** may utilize the caller

profile received for each caller to individually specify output

of voice XML based web pages to callers. For example, the name

of the caller is preferably included in a caller profile or VID.

Where the voice XML **68** includes entries for the name of a caller

20 or other personalized information, voice browser **46** preferably

inserts a name according to a VID or caller profile associated

with a VID.

Referring now to **Figure 4**, there is an illustrative block

25 diagram of an on hold system in accordance with the method,

system, and program of the present invention. As illustrated, on

hold system **42** includes a controller **70**, call hold queues **76a-**

76n, a network interface **74,** voice browser **46,** and a data storage

system **78** communicatively connected via a bus **73**. Additional

systems may be connected along bus **73** that are not depicted
herein. In particular, controller **70** comprises conventional
computer resources including, but are not limited to, at least
one processor, memory, a data storage system, system software and
5   application software, that function together to perform the
functions described with reference to controller **70**.

Network interface **74** preferably communicates with PBX **40** via
a telephone network and network **20** via a network connection such
10   as a wide area network (WAN) connection. In particular, network
interface **74** receives transfers of calls from PBX **40** and then
returns calls to PBX **40** when a call is the next in line within
one of call hold queues **76a-76n.**

15   In the present invention, voice browser **46** preferably
controls audio output and detects audio inputs of voice and/or
keypad tones. In particular, voice XML documents for controlling
initial menu options to a caller may be stored in call queue
service options database **82.** Alternatively, such voice XML
20   documents may be stored remotely, such as at help server **52,** and
accessed via network **20.**

For example, when a call is first received at on hold system
42, a first voice XML scripted document may be utilized to prompt
25   and direct the placement of a call within one of call hold queues
76a-76n. In particular, a caller may be given the option of
selecting between multiple subject matters or skills, where each
of call hold queues **76a-76n** is specified according to a subject
matter or skill. When calls are next in line to be transferred

to a representative, the subject matter or skill of the queue
determines which representatives may receive the call.

Then, depending on the call hold queue, multiple service
options are presented to the caller according to a voice XML
scripted document controlled by voice browser **20**. Service
options may include, but are not limited to, browsing web pages
specified by the on hold system for an incentive, browsing the
web in general, listening to music, news or weather, making a
third-party call, and other activities.

According to an advantage of the present invention, the
subject and service options are first filtered according to the
caller profile associated with the caller VID, such that the
caller is only presented with those options that are specifically
designated by the caller and those options which are tailored to
the caller according to the caller profile. Caller profiles may
be stored in caller profile database **80** and/or accessed from a
remote caller profile server via network **20**.

In addition, to filtering subject and service options to
only present preferred types of options, any output directed by
voice browser **46** to a caller may be specified by a caller's
profile. In particular, the language, dialect, speed, volume and
other characteristics of output to a caller may be specified by
the caller's profile.

Where the caller selects to browse web pages specified by
the on hold system for an incentive, at least one web page or set

of web pages is preferably specified for a caller. In the
present invention, the sets of web pages may include Ahelp@ type
web pages and Aadvertising@ type web pages, where both types of
pages may be specified according to a caller profile and the
5   subject of the hold queue.

Call queue web page directory database **84** advantageously
organizes the multiple browseable web pages according to topic,
type of web page, content of web page, age target of web page,
10   vendor information, and other sortable criteria. Voice XML
scripts may also be included in call queue web page directory
database 84 for directing the caller to select from a hierarchy
of web pages. Controller **70** preferably compiles selections of
web pages from call queue web page directory for each caller.

15

AHelp@ type web pages are advantageous because the caller
may find the answer to the question prompting the current call,
and then hang up without requiring service from a representative.
For example, where a caller selects Amodem problems@ from the
20   menu, a caller's profile may indicate the type of modem or the
caller may further indicate the type of modem. Web pages that
are tailored to the type of modem may then be specified for the
caller.

25   AAdvertising@ type web pages are advantageous because a
vendor may promote a particular product or service. For example,
a vendor may have a new product, where every caller is offered
with an incentive to browse pages about the new product.
Alternatively, a caller profile may indicate that a caller owns a

product that a particular vendor provides accessories for. The
on hold system may then specify web pages that advertise the
accessories for that particular caller.

5   In addition, a third party vendor may be allowed to promote
a product or service to callers. Advantageously, a caller
profile stored according to VID indicates the times and places
that a caller has been exposed to a advertising by different
vendors, such that those advertisements may or may not be
10   repeated. In addition, as previously described, a caller profile
may record, according to VID, advertisements viewed via a web
browser. In particular, the portion of a caller profile
indicating exposure to the vendor may be stored at a server
managed by the vendor according to a caller VID, but accessible
15   to multiple call centers.

According to an advantage of the present invention, on hold
systems may allow multiple external vendors to add Aadvertising@
type web pages to call queue web page directory **84,** where those
20   pages are accessed from external vendor servers accessible via
network **20.** An on hold system may require external vendors to
pay a fee for adding web pages to the directory and may also
charge a fee per caller access. In the previously describe
example where web pages are specified that advertise accessories
25   for a product owned by a particular caller, those web pages may
be specified according to external vendor advertising web pages
logged in call queue web page directory **84.**

In the present invention, promotional offers or incentives

may be made to callers to browse a set of web pages or a
particular web page. Call queue promotional offers database **86**
advantageously includes criteria for making offers. Criteria for
making offers may include a caller profile, a call hold queue

5   selected, and the promotional goals of the vendor running on hold
system **42**. In particular, external vendor logging pages into
call queue web page directory **84** may indicate criteria for making
offers to callers, wherein external vendors reimburse offers.

10   Offers may include values that are redeemable while the
caller is on hold. For example, a value may designate a
particular number of on hold positions that a caller will be
advanced within the hold queue, in addition to natural
advancement within the hold queue. In addition, offers may

15   include values that are redeemable at a future time. For
example, membership points that may be exchanged for products or
services may be provided.

        With reference now to **Figure 5,** there is an illustrative

20   embodiment of a caller profile in accordance with the method,
system, and program of the present invention. As depicted, a
caller profile **90** is preferably specified for a particular caller
VID. Entries within caller profile **90** include preferences,
personal information, products purchased, wait histories, and

25   membership points. In addition, alternate types of information
advantageous for carrying out the present invention, although not
depicted herein, may be included within caller profile **90.**

        According to an advantage of the present invention, an on

hold system accesses caller profile **90** in order to specify
selections of browsable web pages for a caller. In particular,
according to the examples of entries within caller profile **90,**
selections of browseable web pages for a caller may be specified
5   according to music preferences, news preferences, age, sex,
education level, occupation, geographical region, and products
purchased.

According to another advantage of the present invention,
10   incentives that are provided to callers, in exchange for browsing
selected web pages, may be transmitted according to a caller VID
for storage in caller profile **90**. By storing membership points
or other incentives in caller profile **90,** those membership points
are accessible by a caller across multiple call centers and other
15   systems accessible via network **20**. In addition, according to the
advantage of a VID, a caller need only authenticate an identity
at any of multiple call centers to access caller profile **90** and
redeem membership points.

20   In the example, membership points are designated according
to the company granting the points. In alternate examples,
membership points may be categorized and stored according to
other criteria.

25

Referring now to **Figure 6,** there is an illustrative
embodiment of a call hold queue web page directory database in
accordance with the method, system, and program of the present
invention. As depicted, the examples of entries within a

database **91** include help, advertising, and external vendor
entries.

     Advantageously, web page selections may be arranged in a
hierarchy, as illustrated in the help entry, where a voice XML
script may be utilized to guide a caller through the hierarchy.
For example, where a caller first selects a hold queue for
modems, then the type of modem may be determined from a caller
profile or caller entry. If, for example, the caller is calling
in reference to modem Atype A@, the caller may then be prompted
to select from among the hierarchy of help options for modems of
Atype A@.

     In addition, advantageously, web page selections may be
arranged in the hierarchy, as depicted in the advertising
example, where a specific page within the hierarchy is selected
and offered to the caller. For example, a new product A may be
offered to the caller independent of the hold queue selected by
the caller. However, the web page specifically offered to the
caller may be specified according to the caller's geographical
region, which is accessible from the caller profile and/or caller
location context information included in a VID.

     Further, external vendor advertising may be offered to a
caller. In the example, if a caller profile indicates that the
caller owns product C, then the web pages for accessory A,
offered by vendor A0010" for product C, are specified according
to the gender of the caller. A vendor's external server may be
accessed to obtain the voice browsable web pages.

With reference now to **Figure 7,** there is an illustrative
embodiment of scripts that may be utilized to direct caller
browsing according to a queue subject in accordance with the
5   method, system, and program of the present invention. As
depicted, scripts **92, 94,** and **96** are voice XML scripted documents
specified for a particular caller.

Script **92** indicates that a caller may receive a particular
10   incentive in general for selecting to browse modem specific web
pages. In addition, or alternatively, individual incentives may
be specified for browsing each web page.

Preferably the caller is asked to select from among options
15   with designated voice or keypad inputs. For example, if a caller
in the modem call hold queue inputs a A1@, the voice browser will
start the next script, illustrated in block 94. If a caller in
the modem call hold queue inputs a A2", then the voice browser
will start a script asking the caller to designate a web page
20   address to browse.

The voice XML script requested by a voice browser in
response to a caller input is indicated in brackets. In block
94, where the caller in the modem call hold queue inputs a A1@,
25   the voice browser will request a voice XML document stored in a
web page hierarchy at Amodem/faq@. Alternative types of
addressing may be utilized for requesting pages.

In block **94,** if a caller inputs a A2", then the voice

browser will start the next script, as illustrated in block 96.
By providing multiple levels of options, the script may prompt
the caller to narrow the caller's question to the most relevant
information and then retrieve a voice XML script for the web page
5   with the most relevant information.

With reference now to **Figure 8,** there is depicted a high
level logic flowchart of a process and program for controlling a
switching network in accordance with the method, system, and
10   program of the present invention. As illustrated, the process
starts at block **100** and thereafter proceeds to block **102.**

Block **102** illustrates a determination as to whether an off-
hook condition is detected in association with an originating
15   telephony device. If an off-hook condition is not detected, then
the process iterates at block **102.**   If an off-hook condition is
detected, then the process passes to block **104.**
Block **104** depicts a determination as to whether a VID is
transferred from the off-hook device. The originating telephony
20   device may authenticate an identity for a caller. However, the
PSTN or other servers connected thereto may require additional
authentication within a trusted network for access to certain
types of services. If a VID is received and no additional
authentication is required, then the process passes to block **110.**
25   If a VID is not received or if the PSTN requires additional
authentication, then the process passes to block **106.**   Block **106**
illustrates transferring the call to an intelligent peripheral or
a telco application server for authentication. Block **108** depicts
a determination as to whether the VID and the call are returned

to the switching center. If not, then the process iterates at block **108**. If the VID and the call are returned, then the process passes to block **110**.

5   Block **110** depicts looking up the caller profile according to VID. The caller profile may be stored in a database within the PSTN, in an extended network to the PSTN or in a network external to the PSTN. Next, block **112** illustrates initiating services designated in the caller profile retrieved according to the VID.

10   Thereafter, block **114** depicts routing the call and the VID to a destination device according to received digits or a voice command, and the process passes to block **116**.

          Block **116** illustrates a determination as to whether the

15   destination device is detected with a pick-up (off-hook) condition. If the destination device does not pick-up, then the process ends. If the destination device does pick-up, then the process passes to block **118**.

          Block **118** depicts a determination as to whether an RVID is

20   transferred from the destination device. If the RVID is transferred, then the process passes to block **124**. If not, then the process passes to block **120**. Block **120** illustrates transferring the call to an intelligent peripheral or telco application server. Next, block **122** depicts a determination as

25   to whether an RVID and call are received back at the switching center. If not, then the process iterates at block **122**. When the RVID and call are received, then the process passes to block **124**.

Block **124** illustrates initiating services designation in a
caller profile associated with the RVID. Next, block **126** depicts
transferring the RVID to the originating device for output to the
caller. Thereafter, block **128** illustrates proceeding with the
5 call, where additional services are applied when applicable, and
the process ends.

With reference now to **Figure 9,** there is depicted a high
level logic flowchart of a process and program for controlling a
10 PBX system within a call center in accordance with the method,
system, and program of the present invention. As illustrated,
the process starts at block **130** and thereafter proceeds to block
132.

15 Block **132** depicts a determination as to whether a new call
is received. If a new call is received, then the process passes
to block **138.** If a new call is not received, then the process
passes to block **134.** Block **134** illustrates a determination as to
whether or not a call processing request is received. When a
20 call is at the top of the call queue, the call is preferably
transferred back to the PBX with a call processing request. If a
call processing request is not received, then the process passes
to block **132.** If a call process request is received, then the
call is transferred to the next available representative with a
25 VID, as depicted at block **136,** and the process ends.

Block **138** illustrates a determination as to whether or not a
representative is available. If a representative is available,
then the call is transferred to the next available representative

with a VID, as illustrated at block **140**, and the process ends. If a representative is not available, then the process passes to block **142**. Block **142** illustrates distributing the call to the on hold system with the VID, and the process ends.

With reference now to **Figure 10**, there is depicted a high level logic flowchart of a process and program for controlling an on hold system in accordance with the method, system, and program of the present invention. As illustrated, the process starts at block **150** and thereafter proceeds to block **152**.

Block **152** depicts a determination as to what event occurred when an event occurs. If a new call is received, then the process passes to block **154**. If a call is detected as being the next in line in a queue, then the process passes to block **178**.

Block **154** illustrates retrieving a caller profile according to the caller VID. Next, block **156** depicts playing a menu of options to a caller. As previously described, the menu of queue options and other output to a caller may be specified according to a caller profile detected according to caller ID.

Next, block **158** illustrates a determination as to whether a caller has selected from the menu options. If a caller does not select from the menu options, then the call is placed in a default queue, as illustrated at block **162**, and the process passes to block **164**. If a caller does select from the menu options, then the process passes to block **160**.

Block **160** depicts placing the call in one of the multiple queues depending on the menu selection. Next, block **164** illustrates specifying browsing options and offers for that queue for the caller according to the caller profile and current

5   offers. Thereafter, block **166** depicts playing tailored browsing options to the caller. In addition other service options may be presented to the caller.

Block **168** depicts a determination as to whether the caller

10   selects a browser option. The process may iterate at block **168** for a period of time if no browser option is selected. When a browser option is selected, then the process passes to block **170**.

Block **170** illustrates transmitting a request to the

15   designated server for the selected web page documents. Next, block **172** depicts a depicts a determination as to whether the selected documents are received in voice XML. If the selected documents are received in voice XML, then the voice XML documents are translated by the voice browser into audio output to the

20   caller, as depicted at block **174,** and the process passes to block **176**. If the selected documents are not received in voice XML, then translation and transcoding of the documents into the voice XML format is performed, as illustrated at block **171**, before the process passes to block **174**.

25

Block **176** depicts updating the caller profile with the incentive offer earned by the caller for browsing specified web pages, and the process ends. In particular, the incentive stored at a caller profile may be redeemable during the current call or

in the future through one of multiple interfaces.

In response to the call being next in line in a queue, the
caller is notified of the next in line status, as illustrated at

5   block **178**. Next, block **180** depicts a determination as to whether
the caller indicates a readiness to transfer to a representative.
According to the advantage of the present invention, the caller
may access needed information by voice browsing and no longer
needs the assistance of a representative. If the caller does not

10 indicate a readiness to transfer to a representative, then the
call is removed from the queue, as illustrated at block **184,** and
the process ends. If a caller does indicate a readiness to
transfer to a representative, then the process passes to block
182. Block **182** depicts transferring the call to the PBX system

15 to be transferred to a representative according to the menu
option(or queue subject) selected by a caller, and the process
ends.

It is important to note that while the present invention has

20 been described in the context of a fully functioning data
processing system, those of ordinary skill in the art will
appreciate that the processes of the present invention are
capable of being distributed in the form of a computer readable
medium of instructions and a variety of forms and that the

25 present invention applies equally regardless of the particular
type of signal bearing media actually used to carry out the
distribution. Examples of computer readable media include
recordable-type media, such as a floppy disk, a hard disk drive,
a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as

digital and analog communications links, wired or wireless
communications links using transmission forms, such as, for
example, radio frequency and light wave transmissions. The
computer readable media may take the form of coded formats that
5   are decoded for actual use in a particular data processing
system.

While the invention has been particularly shown and
described with reference to a preferred embodiment, it will be
10   understood by those skilled in the art that various changes in
form and detail may be made therein without departing from the
spirit and scope of the invention.